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GLOBAL NAVIGATION SATELLITE SYSTEM REFLECTOMETRY SMALL SATELLITE PLATFORM

Abstract

The aim of the GNSS-R In-Orbit Demonstrator (GNSS-R IOD) is to implement a reduced capability, low risk instrument which will demonstrate accurate mesoscale ocean altimetry using GNSS reflected signals from space. It will verify the achievable performance of the technique and demonstrate its applicability to and usefulness for a wide range of additional remote sensing observations, such as ionospheric total electron content determination, ice topography, biomass determination and soil moisture.

The proposed GNSS-R IOD will be a low cost mission, based on the existing PROBA small satellite platform. This development is currently in phase A, with QinetiQ Space as ASTRIUM subcontractor to develop the platform. From the study it is shown that the PROBA platform is very much suited as the GNSS-R IOD mass, volume and power requirements are similar to the previous PROBA missions. A compact S/C design is proposed that carries the main payload, having only minor changes compared to previous PROBA designs.

The PROBA platforms are unique and have several strong points, such as the autonomous operation in-orbit and on ground (low operational cost), the high pointing accuracy and stability, the very performant on-board computer and the ESA quality label. The strong on-board and on-ground autonomy will be exploited for the GNSS-R IOD mission to autonomously schedule observation requests and specific calibration request.

With previous PROBA missions, QinetiQ Space has gained substantial experience in end-to-end mission performance analysis (e.g. like assessment of geolocation accuracies), creation of on-board ancillary data, time synchronisation between payload and on-board time, on-board compression, creating user-segment requirements, interactions between user-segment and ground-segment, etc.

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